Listing of All Claims Including Current Amendments

1. (currently amended) A method for detecting an impurity in a sample having at least one analyte comprising the steps of:

obtaining characteristic measurements of the sample;

selecting a value representing an anticipated number of components in the sample;

generating a matrix representing <u>said</u> characteristic measurements for the sample, said characteristic measurements having at least two variables in each dimension;

repeatedly selecting a subset within said matrix for analysis of the relation between the analyte and impurity;

constructing a projection matrix by projecting each of the characteristic measurements onto said subset to calculate a residual error; and

calculating an index from said subset to assess purity of the sample.

- 2. (original) The method of claim 1 wherein said index represents a purity index.
- 3. (original) The method of claim 1 wherein said index represents an impurity index.
- 4. (original) The method of claim 1 wherein said characteristic measurements contain a baseline component.
- 5. (original) The method of claim 1 wherein said characteristic measurements do not contain a baseline component.
- 6. (original) The method of claim 1 wherein said characteristic measurements are spectra associated with a chromatographic peak.

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7. (original) The method of claim 3 wherein said impurity index is represented as *E* and calculated according to the equation:

$$E = \sqrt{\frac{\mathbf{e}^{\mathrm{T}}\mathbf{e}}{n - r_0 - r_1}}$$

- 8. (original) The method of claim 6 wherein said matrix is dimensioned with data representing retention times for the chromatographic peak and wavelengths for the spectra.
- 9. Cancelled.
- 10. (currently amended) The method of claim θ 1 further comprising the step of calculating said residual error represented by e according to the equation:

$$e = (I - P_0)r$$

11. The method of claim 1 wherein said subset is represented by a sub-matrix \mathbf{R}_j having values which can be decomposed into the expression:

$$\mathbf{R}_{j} = \mathbf{U}_{j} \mathbf{S}_{j} \mathbf{V}_{j}^{\mathsf{T}}$$

12. The method of claim 2 wherein said purity index is represented by k_j and is calculated from S_j according to the equation:

$$k_j = \frac{\sum_{i=1}^{r_0 + r_1} s_i}{s_i}$$